INVESTING IN BANKRUPT STOCKS: IS IT A SWEET TRICK?

Ben Branch[1], Min Xu[2*]

[1]Professor of FinanceIsenberg School of Management University of Massachusetts Amherst.
Email: branchb@isenberg.umass.edu.
[2] Assistant Professor of Finance College of BusinessUniversity of Detroit Mercy.Email:xumi@udmercy.edu.

KEYWORDS	ABSTRACT
Chapter 11, bankruptcy, holding period return.	We track the holding period return from investing in bankrupt stocks using a buy-and-hold strategy, buying the stocks on the bankruptcy filing date and holding them until the final resolution date (reorganization or liquidation). We find that holding a simple long position in the bankrupt stocks will generally lead to a large loss. The holding period return computed from the stock price alone cannot show the entire story. When considering final distributions plus the stock price, we seea much greater loss. In our regression analysis, we find that liquidity is always a key factor in explaining the returns. Profitability and information uncertainty plays a significant role in explaining the positive returns, while liquidity and (un)profitability are the two key issues associated with the negative returns. In addition, the involvement of hedge funds does not seem to be associated with better stock performance.

1. INTRODUCTION

Bankruptcy filing is a significant economic event in a corporation's life cycle. Prior research documents negative market reactions to bankruptcy filing announcements (Clark and Weistein (1983), Datta and Iskandar-Datta (1995), Dawkins and Rose-Green (1998), and Coelho and Taffler (working paper, 2008)). The securities of a publicly owned firm that files for Chapter 11 often continue to trade. If such a firm's securities are delisted by the NYSE, Nasdaq or AMEX, their trading may move to the Pink Sheets.

One of the most noticeable characteristics of the stocks of most bankrupt firms is the dramatic decline in their price as compared to its prior levels. These very low prices (typically a stock that may have traded in the tens of dollars now trades in the pennies) often draw attention from unsophisticated individual investors who rush in to buy. Such investors may expect,or at least hope, for a huge profit when the company reorganizes and emerges from Chapter 11. They may believe that even if they don't make a killing, any loss will be limited due to the already depressed current level of the stock price. Such investors may not contemplate the likelihood that thestockwill become worthless. A stock that falls from pennies a share to zero is still a 100% loss, a not uncommon result.

Herein weexplore both the performance and the major factors which help explain the performance of these bankrupt stocks. The holding period return performance is measured in three ways:1. The

*Corresponding author

simple holding period return which only uses the price information: 2. The comprehensive holding period return which takes account of both price and final distributions specified in the reorganization or liquidation plan, and; 3.Alpha estimated from Carhart four-factor model (Carhart,1997).

We find that a strategy of buying such stocks on the date of their bankruptcy filing day and holding until the final resolution date has produced significant negative returns for allthree measures. The stock price alone may provide an illusion of limited loss exposure. The final distribution, however, reveals that investors will generally suffersevere losses. Over half of our sample, for which the plan of reorganization can be identified, cancel or extinguish their pre filing shares. As a result the common stock holders receive nothing and their stocks become worthless on the final resolution date.

In our multivariate regression analysis, we test three accounting variables, liquidity, profitability, and leverage, plus one dummy representing whether a firm suffers from financial distress pre bankruptcy, and one proxy for information uncertainty. The uncertainties of the Chapter 11 process add significant risk to investing in bankrupt stocks. We find liquidity to be the key factorin explaining stock returns. Profitability and information uncertainty are significant in explaining the positive returns, while liquidity and (un)profitability are the two major concerns for negative returns. Another interesting factor, the involvement of hedge funds, also draws our attention as hedge fund managers are experienced investors. We explore whether they are able to select stocks with more attractive potentials. Our results, however, do not support this hypothesis.

Our paper contributes to the relevant literature in several ways. First, we extend the existing literature which document the large loss around the bankruptcy filing period (Clark and Weinstein (1983), Datta and Iskandar-Datta (1995), etc) and poor long-term after bankruptcy performance (Hotchkiss (1995), Coelho and Taffler (working paper, 2008), etc) by investigating the period during Chapter 11. This period draws our interests as investors are lured into the market by noticing a record low stock price upon bankruptcy filing, but is the deal really as sweet as it looks?

Second, differing from Li and Zhong (2013) and Coelho and Taffler (working paper, 2008)which also focus on stock performance during Chapter 11is the comprehensive way we look at the holding period return. Investing in bankrupt stocks is not purely a financial activity, as it involves the uncertainty of the Chapter 11 legal process. The returns are also determined by the distributions listed in the reorganization plans, which are largely out of most investors' control. Therefore, the simple holding period return which only uses stock price is a biased measure of the return over the full Chapter 11 period. Combining the final distribution to the investors with the stock price information provides a more accurate understanding of the return scheme for bankrupt stock.

Third, our regression analysis uses lagged information in the year before bankruptcy filing, in order to test whether investors can rely on this available information when they invest in the bankrupt stocks. In addition to some traditional accounting variables, such as liquidity, profitability and leverage, we also explore whether a company files for bankruptcy due to financial distress or some other strategic purpose. More interestingly, we add a dummy variable for hedge fund participation, as hedge funds are managed by veteran investment managers whomay be able to identify situations which offer higher returns.

2. LITERATURE REVIEW

The effect of a Chapter 11 filing on distressed companies' stocks has been well explored. Clark and Weinstein (1983) find large losses occur during the bankruptcy filing month. Those losses are especially concentrated in the three trading day interval surrounding the filing. Datta and Iskandar-Datta (1995), who explore the impact of a bankruptcy announcement on stock and debt holders, find a significant negative stock price reaction to the announcement. Dawkins and Rose-Green (1998) investigate the relationship between any prior WSJ discussions of possible bankruptcy filings and the price reaction to an actual filing. They also find significant negative abnormal returns around the bankruptcy filing date. The price reaction to bankruptcy filings is smaller for firms having prior WSJ stories of potential bankruptcy filings. Rose-Green and Dawkins (2002) explore the tendency of the stock market to differentiate between strategic bankruptcies and financial bankruptcies. Financial bankruptcy is characterized by short- or medium-term financial distress, such as default on interest or principal payment. Strategic bankruptcy is characterized by filing for Chapter 11 against one identifiable stakeholder (such as unionized employees), aiming to benefit the firm at the expense of the interest of that specific stakeholder. They find significantly less negative abnormal returns for strategic bankruptcies around the filing dates. Dawkins, Bhattacharya, and Bamber (2007) find, on average, the more negative the filing period price reaction, the more favorable the immediate post-filing returns. Coelho and Taffler (working paper, 2008) also document negative abnormal and raw returns at the Chapter 11 filing date.

Related to our paper, many studies discuss the long-term performance of the stock of bankrupt firms after they emerge from Chapter 11, although the results are mixed. Morse and Shaw (1988) find that while trading in bankrupt stocks has become much more common, three year average returns for firms emerging from bankruptcy are positive and large but not significantly so, implying that no abnormal return is likely to be available. Hotchkiss (1995), who studies the operating performance of bankrupt firms after they emerge from Chapter 11, finds that over 40% of the firms continue to suffer operating losses in the first three years after emergence. Covering a more recent time period, Hotchkiss and Mooradian (2004) find that more than two thirds of their sample underperforms industry peers for up to five years after emergence. Coelho and Taffler (working paper, 2008), who explore the long-term reaction to Chapter 11 filings, find strong negative and statistically significant post-Chapter 11 abnormal returns of at least -28% over the 12-month period after the Chapter 11 announcement. On the other hand, Eberhart, Altman, and Aggarwal (1999), who examine the equity performance of firms going through Chapter 11, document large positive excess returns over the 200 trading days following emergence. Kalay, Singhal, and Tashjian (2007) find that their sample experiences significant improvement in operating performances during Chapter 11. While Alderson and Betker (1999) report that the five year average annualized post emergence return of reorganized firms neither under- nor out-perform the S&P 500.

The characteristics and factors that impact the distressed bond/stock returns of bankrupt firms have been extensively studied. Morse and Shaw (1988) show that filing for bankruptcy generally does not change systematic risk significantly but does significantly increase return variance. Datta and Iskamdar-Datta (1995) investigate both bond and stock returns. They find that three different classes of debt holders react differently to the information revealed by the bankruptcy filing. The secured debt holders are unaffected by the announcement. The unsecured and the convertible debt classes, in contrast, show significant adverse price reaction to the announcement. In addition, in the 21-day event period, the secured debt holders gain significantly while all other classes suffer substantial losses. Duration and complexity of the reorganization process both have a negative impact on the excess returns of bonds. Leverage is positively related to securities' excess returns.

Griffin and Lemmon (2002) examine the relationship between book-to-market equity, distress risk, and stock returns. In the most distressed group, the return difference between high and low book-to-market is more than twice as great as that of the other groups. Campbell, Hilscher, and Szilagyi (2008) explore the determinants of the pricing of financially distressed stocks. They find such stocks have delivered anomalously low returns since 1981. Those stocks have lower returns but much higher standard deviations, market betas, loadings on value and small-cap risk factors than do stocks with a low risk of failure.

3. HYPOTHESIS, DATA AND METHODOLOGY

3.1 Hypothesis

While the negative performance of bankrupt stocks is well documented, most of the returnsare calculated based on stock performance only. However, the entire Chapter 11 process is full of rich content, such as plan of reorganization, disclosure statement, etc. The information generated during the Chapter 11 process should not be neglected. If we combine the stock price and the reorganization treatment information for the common stock class, we should be able to assess the performance of bankrupt stocks more effectively. In addition, the largely negative stock performance of a sample of bankrupt stocks is a reflection of overall performance. Such average overall performance does not by itself rule out the possibility that making a profit by investing incarefully selected bankrupt stocks. Therefore, we test the following two hypotheses in this paper:

Hypothesis 1: Investing in bankrupt stocks would generate a larger loss considering both stock price and the final distributions to old common stock holders, compared to the existing literature which largely uses stock prices only to compute returns.

Hypothesis 2: Stocks of bankrupt companies with profit potential behave differently compared to the ones without such potential.

3.2 Data

Our sample collection process is outlined in Table 1. We obtain our initial list of 2776 bankruptcy filings from 1978 to 2008 from the bankruptcydata.com database. First, we checked their records on the Center of Research in Security Prices (CRSP) database. The1007 cases that werenot found in CRSP were eliminated. Second, we checked how many of the remaining firms have trading information during their Chapter 11 process thereby eliminating 1209 firms that were delisted prior to or upon their bankruptcy filing. Of the remaining 560 firms, 80 additional cases were removed because their data were unavailable or they were still in Chapter 11 in 2010. Nineteen firms were also excluded as they have missing trading information during the bankruptcy period, and 7 more firms were removed as their first available trading date is longer than 5 days after the Chapter 11 filing. Following Fama and French (2001), we exclude 55 financial (SIC code 6000-6999) and utility firms (SIC code 4900-4999), as the financial decisions of utility firms are affected by regulation and the financial ratios of financial firms are not comparable to those of other industrial firms. Accounting information from COMPUSTAT is also required, thereby eliminating another 104 firms, our final sample consisted of 295 firms.

Table 1: Sample Collection Process

	Number of Firms	Percentage
Initial Samples	2776	100.0%
- No CRSP Data	1007	36.3%
- No trading during Ch 11	1209	43.6%
- Data N/A or still in Ch 11	80	2.9%
- Missing trading info	19	0.7%
- First trading date is more than 5 days after Ch 11 filing	7	0.3%
- Financial and Utility Firms	55	2.0%
- No Compustat Data	104	3.7%
Final Sample	295	10.6%

3.3 Return to existing common stock holders

We assume that the investor buys the stocks as soon as a trouble company files Chapter 11, probably expecting that it can successfully reorganize and resume trading on major stock exchanges. Such investors are assumed simply to buy the bankrupt stocks and hold them until the resolution date of Chapter 11 case.

We consider three measures for the returns to existing common stock holder starting with the simple holding period return (S-HPR), which only uses the trading information (stock prices) available from CRSP:

$$\text{S-HPR} = \text{Price}_{Last} / \text{Price}_{First} - 1 \qquad (1)$$

in which Price_{Last} is the last available stock price, and Price_{First} is the stock price on the bankruptcy filing date. S-HPR is the most straightforward way to look at the returns as stockholders simply buy-and-hold the bankrupt stocks.

Our second measure also takes account of the final distributions to the pre filing common stock holders.Of these 295 firms, we are able to obtain the Chapter 11 plan of reorganization for 71 firms primarily from PACER. The company's reorganization plan contains a detailed discussion of each class of claimholders' treatments. Generally the existing common stock holders will be compensated according to the terms provided that the required majority of creditors vote to accept the plan. Otherwise, the shareholders will receive no more from the company than they would have received in liquidation (usually nothing). In49 out of 71 bankruptcies in our sample the old common shares were cancelled on the effective date giving existing shareholders nothing. While cash is almost never distributed to those holding old shares, a combination of new shares and warrants may be distributed. The stock in the reorganized company almost always goes largely or exclusively to its creditors.

A comprehensive way of calculating the return to the old stockholders should include the distribution to the old shareholders listed in the plan of reorganization, which requires information on: 1) the resolution of Chapter 11 filing; 2) type and amount of securities received; and 3) price of the securities on the effective date. The comprehensive holding period return (C-HPR) to old shareholdersis calculated as:

C-HPR = [Ending Value – Beginning Value] / Beginning Value   (2)

in which, Ending Value = Distribution per share made to old common stock holders

 = [# of new shares received × Price of new shares on effective date +

  # of warrants received × Value of warrant on effective date + Cash]

Beginning Value = Stock price in bankruptcy filing date

If the old shareholders retained their existing stock, the ending value will be the stock price on the effective date.

Our third measure follows Carhart (1997), which assumes that a stock's expected return is explained by the market portfolio and three factors designed to mimic the risk factors related to size, book-to-market, and momentum. The model takes the form:

$r_{i,t} - r_{f,t} = \alpha_i + b_i(r_{m,t} - r_{f,t}) + s_iSMB_t + h_iHML_t + w_iUMD_t + \varepsilon_{i,t}$ (3)

where $r_{i,t}$ is the return on stock i at time t, $r_{f,t}$ is the risk-free rate at time t. $r_{m,t} - r_{f,t}$, SMB_t, HML_t, and UMD_t are the risk premium on the market portfolio, the difference between the returns on portfolios of small stocks and large stocks, the difference between the returns on portfolios of high and low book-to-market stocks, and the difference between the returns on portfolios of high prior returns and low prior returns. We obtained the SMB, HML, and UMD from Kenneth French database. We estimate a time-series regression for each bankrupt stock using its daily returns over the entire period during Chapter 11, and use intercept α_i as risk-adjusted return for stock i.

4. RESULTS AND DISCUSSIONS

4.1 Descriptive statistics

Table 2 contains accounting performance data for our sample. Panel A reports the summary statistics of our variables one year before the official bankruptcy filing. The median asset value of our sample is $96.14 million with standard deviation of $3,542 million. Thus our sample does not appear to over represent either small or large firms. Not surprisingly, we find that our sample tends to suffer from negative net income, low book equity, and high book-to-market. We also construct four variables to represent the major areas of interest. We use Altman's Z-score to measure the overall bankruptcy risk. CA/TA is calculated using current assets divided by total assets, which is a liquidity measure. EBIT/TA is calculated using earnings before interest and taxes divided by total assets, which is a profitability measure. TL/TA is calculated using the total liability divided by total assets, which is a leverage measure. We see these four variables as most directly related to our sample firms' performances. We find that our sample suffers from poor operating conditions, shown in negative Z-scores, indicating high levels of bankruptcy risk, negative profitability, and high leverage. Panel B shows the correlations between all the variables. The overall bankruptcy risk measures Z-score is highly correlated with profitability measure EBIT/TA. Therefore, putting them into the same regression would result in a high level of multicollinearity.

Table 2: Sample Characteristics

Panel A: Summary statistics

	N	Mean	Median	Min	Max	StdDev
Total Assets (MM$)	238	986.87	96.14	6.75	25197.00	3542.00
Net Income (MM$)	238	-150.36	-14.13	-3960.35	44.36	590.22
Book Equity	238	23.24	16.30	-2824.00	1550.20	445.31
Book/Market	238	3.25	2.54	-239.20	143.57	23.55
Z-score	238	-36.69	-1.48	-6664.82	16.57	432.85
CA/TA	238	0.46	0.48	0.00	0.97	0.25
EBIT/TA	238	-0.91	-0.06	-170.72	0.22	11.07
TL/TA	238	0.88	0.79	0.08	5.05	0.56

Panel B: Correlation matrix

	Total Assets	Net Income	Book Equity	B/M	Z-score	CA/TA	EBIT/TA	TL/TA
Total Assets	1.00	-0.46	0.00	0.06	0.02	-0.24	0.02	0.02
		(0.00)	(0.97)	(0.35)	(0.73)	(0.00)	(0.73)	(0.74)
Net Income	-0.46	1.00	0.50	0.11	0.42	0.20	0.43	-0.02
	(0.00)		(0.00)	(0.10)	(0.00)	(0.00)	(0.00)	(0.73)
Book Equity	0.00	0.50	1.00	0.29	0.42	0.00	0.42	-0.11
	(0.97)	(0.00)		(0.00)	(0.00)	(0.96)	(0.00)	(0.09)
B/M	0.06	0.11	0.29	1.00	0.04	0.01	0.04	-0.39
	(0.35)	(0.10)	(0.00)		(0.49)	(0.88)	(0.54)	(0.00)
Z-score	0.02	0.42	0.42	0.04	1.00	0.09	1.00	0.06
	(0.73)	(0.00)	(0.00)	(0.49)		(0.15)	(0.00)	(0.35)
CA/TA	-0.24	0.20	0.00	0.01	0.09	1.00	0.09	0.08
	(0.00)	(0.00)	(0.96)	(0.88)	(0.15)		(0.18)	(0.23)
EBIT/TA	0.02	0.43	0.42	0.04	1.00	0.09	1.00	0.07
	(0.73)	(0.00)	(0.00)	(0.54)	(0.00)	(0.18)		(0.31)
TL/TA	0.02	-0.02	-0.11	-0.39	0.06	0.08	0.07	1.00
	(0.74)	(0.73)	(0.09)	(0.00)	(0.35)	(0.23)	(0.31)	

4.2 Holding period return (HPR)

Table 3 contains statistics for our S-HPR, C-HPR, and alpha. To make the results comparable, we also calculate the annualized HPR for S-HPR and C-HPR. Not surprisingly, we find negative returns over the holding period overall. The average annualized S-HPR, which only uses the stock price information, is -25.1%, with a median of -78.9%. The average annualized C-HPR, which involves both the stock price and the final distribution from the company to existing shareholders, is -76.9%, with a median of -100.0%. We find that the way we calculate the C-HPR generates a more severe loss compared to S-HPR. Therefore, looking at the stock price alone is not sufficient

and will produce a biased (too optimistic) result. If an investor holds the stock until the final resolution date, the distributions specified in the reorganization or liquidation plans are usually not favorable to the common stockholders, as they have the lowest priority status among the claims. Secured claims, secured tax claims, priority non-tax claims, and some DIP claims, enjoy first priority. Usually their status will be unimpaired and they will be paid in full. Other creditor claims come next followed by preferred stock. Under absolute priority they are entitled to a full recovery before any distribution to common. Common stock, which is in the class of equity interest, is at the end of the distribution list. Not only is the equity class impaired, the common stock will usually be extinguished or cancelled on the effective date, and will thereby become worthless. In the worst (but likely) scenario of being cancelled, the shareholders will lose every penny they have invested (-100% return).

Table 3: Returns of Bankrupt Stocks

	S-HPR		C-HPR		Alpha
	HPR	AHPR	HPR	AHPR	
Mean	-22.3%	-25.1%	-69.7%	-76.9%	-2.8%
Median	-40.0%	-78.9%	-100.0%	-100.0%	-1.8%
Min	-99.4%	-100.0%	-100.0%	-100.0%	-75.0%
Max	528.6%	250.1%	206.9%	78.8%	92.4%
StdDev	82.1%	110.8%	74.3%	48.4%	10.7%
Skewness	3.96	1.67	3.07	2.26	0.99
Kurtosis	21.46	1.49	8.95	4.26	33.22
t-statistics	-4.65	-3.88	-7.90	-13.38	-4.20
N	295	295	71	71	266

4.3 Regression Results

Although investing in bankrupt stocks is very likely to produce overall losses, 60 firms enjoy a positive S-HPR and 52 firms enjoy positive alphas. In this section, we explore what factors contribute to whether an investor can profit by investing in bankrupt stocks. We categorize our HPR into positive and negative groups. Our first regression focuses on the accounting performances only, which is estimated as

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\ pre1} + \beta_3 * TL/TA_{i,\ pre1} + \beta_3 * TL/TA_{i,\ pre1} +$$

$$\beta_4 * Log\ (Total\ Assets)_{i,\ pre1} + \beta_5 * B/M_{i,\ pre1} + \varepsilon_i \tag{4}$$

in which we investigate three major measures of accounting performance, liquidity which is represented by CA/TA, profitability which is represented by EBIT/TA, and leverage which is represented by TL/TA, in one year before the bankruptcy filing. We also control for size and book-to-market at the same time. We run the regression for all HPR and for both positive and negative HPR. The results are shown in Table 4. For all the HPR, we obtain significant regressions for S-HPR and alpha. For both of these two measures, CA/TA, which is our liquidity measure, is significantly positively related to S-HRR with a coefficient of 0.435 and alpha with a coefficient of 0.079, indicating that firms with higher liquidity before filing for bankruptcy tend to generate a higher stock returns during the Chapter 11 period. These results show that, overall, liquidity is more likely to be a key factor in determining the holding period returns for the distressed stocks.

EBIT/TA, our profitability measure, is only significantly positively linked to alpha, and TL/TA, our leverage factor is not significant in our regression results.

Further, we categorize our returns into groups of positive and negative ones to test whether our explanatory factors play different roles between these two groups. For C-HPR, we only have five firms that offer positive HPR, therefore, we are not able to run the regression for positive C-HPR. For the positive returns, our model is good for S-HPR, but not for alpha. For S-HPR, profitability measure EBIT/TA is the key explanatory factor. The coefficient estimate is 1.718 and significant at 5% level, showing that higher profitability generally contributes to higher returns. However, liquidity and leverage are not significant in explaining the positive S-HPR. For the negative returns, the three regressions are significant at least at the 10% level. Liquidity is a key factor here as it is significant for S-HPR, C-HPR, and alpha. All three coefficient estimates are significantly positive, 0.202 for S-HPR, 0.207 for C-HPR and 0.045 for alpha, revealing that greater liquidity tends to contribute to higher returns for investors. Profitability is also an important factor for C-HPR and alpha. We find a coefficient of 0.003 for C-HPR and 0.028 for alpha and both a significant, demonstrating that higher profitability is also associated with higher returns. Leverage is only significant in the regression for S-HPR, 0.081, indicating that higher leverage will lead to higher returns for investors. The results for C-HPR and alpha are quite comparable, as we believe that C-HPR and alpha are more comprehensive ways to show the returns, compared to S-HPR which only takes account of the stock price. Another surprising finding is that the three accounting variables along with the two control variables produce a useful model for the positive S-HPR, as it explains 23% of the return, while for the negative return, the same model can only explain about 6%-8% of the returns.

Table 4: Regression - Accounting Performances Only

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.282	-1.028	0.056*	0.378	0.203*	-0.467***	-0.355***	0.002
	(0.2085)	(0.1009)	(0.0679)	(0.5406)	(0.0726)	(<.0001)	(0.0002)	(0.9360)
CA/TA	0.435**	0.475	0.079***	0.009	0.195*	0.202**	0.207**	0.045*
	(0.0507)	(0.5049)	(0.0071)	(0.9887)	(0.0571)	(0.0175)	(0.0265)	(0.0543)
EBIT/TA	0.003	0.001	0.028**	1.718**	0.031	0.001	0.003*	0.028***
	(0.5619)	(0.9328)	(0.0470)	(0.0318)	(0.7238)	(0.4400)	(0.0542)	(0.0087)
TL/TA	0.132	0.041	0.002	0.587	0.011	0.081**	0.020	-0.016
	(0.2015)	(0.8480)	(0.9049)	(0.1659)	(0.8065)	(0.0386)	(0.6392)	(0.2050)
Log(Total Assets)	0.028	0.092	-0.008*	0.080	-0.011	-0.010	-0.044***	-0.001
	(0.3641)	(0.2000)	(0.0592)	(0.5054)	(0.5919)	(0.3826)	(0.0007)	(0.7327)
B/M	0.003	0.002	0.000	0.029**	0.000	0.002*	0.000	-0.001
	(0.2941)	(0.6805)	(0.9633)	(0.0436)	(0.6068)	(0.0643)	(0.9507)	(0.1306)
R-Square	4%	8%	5%	23%	11%	6%	8%	7%
F-Value	2.17*	0.91	2.25**	2.62**	0.86	2.14*	3.10**	2.56**
N	238	56	214	49	40	175	42	174

Investing in bankrupt stocks involves high risks, which mainly results from the information uncertainty inherited in the stocks and the situation for the company. As discussed by Li and Zhong (2013), the uncertainty comes from two parts. First, as many firms are delisted from major exchanges due to their inability to meet the requirement for continued listing, and many institutional investors are restrained from holding bankrupt stocks, public information coverage becomes very limited after the official bankruptcy filing. Second, the complexity of the Chapter 11 process adds more uncertainty to the investment due to the nature of the legal process and the lower rank status of common stock holders. Therefore, we want to incorporate information uncertainty into our analysis. Zhang (2006) noted that information uncertainty mainly results from two sources. One is the volatility of a firm's underlying fundamentals and the other is poor information. He advances six proxies of information uncertainty: firm size, firm age, analyst coverage, dispersion in analyst forecasts, return volatility, and cash flow volatility. Following his methodology, weuse Stdev Pre-1 Ret, which is the standard deviation of daily returns in the year prior to the bankruptcy filing as our proxy for the information uncertainty inherent in our bankrupt company stocks.

Another interesting factor is the motivation for the bankruptcy filing. Traditionally, firms may file bankruptcy because of severe financial difficulties, such as an inability to pay its financial obligations as they come due. As discussed in the previous literature, some bankruptcy cases may be filed as a tactic for dealing with legal disputes, labor contracts, or for other strategic purposes. The troubled firms may be doing well financially, but need or prefer to file bankruptcy in order to address operating troubles from the vantage point of debtor under the protection of the bankruptcy court. Therefore, in our second regression, we add a dummy variable, Distress, which takes the value of 1 if the EBIT becomes negative a year before bankruptcy, indicating that the firm suffers extreme financial distress, and zero otherwise. Our second regression is estimated (Table 5),

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} + \beta_3 * TL/TA_{i,\,pre1} +$$

$$\beta_4 * Distress_{i,\,pre1} + \beta_5 * (Stdev\ Pre\text{-}1\ Ret)_{i,\,pre1} +$$

$$\beta_6 * Log\ (Total\ Assets)_{i,\,pre1} + \beta_7 * B/M_{i,\,pre1} + \varepsilon_i \qquad\qquad (5)$$

The overall results are quite similar to what we have obtained in Table 5. Our model is good for S-HPR and alpha, but not for C-HPR. Liquidity still plays a positively significant role in explaining the holding period returns. One of our newly added variables, Distress, is significant in explaining alpha. With coefficient of -0.028, the result suggests that firms that file for bankruptcy due to the real financial distress, rather than strategic purposes, do tend to suffer worse stock performance. For the positive HPR, similar to the results from our first regression, the profitability measure, EBIT/TA is still significantly positive for S-HPR. The coefficient is 1.530 and significant at 5% level. The stdev pre-1 ret is also an important explanatory factor in S-HPR. The coefficient is -17.891 and highly significant at the 1% level, revealing that the higher the volatility, the higher the information uncertainty inherent in the stock, which contributes to more negative returns. Compared to our previous regression, adding distress and stdev pre-1 ret variables make the entire regression explain 35% of the positive returns in S-HPR, increasing from 23% in our first regression. Therefore, profitability and information uncertainty are two important factors in explaining the positive HPR. For the negative returns, the results are quite similar to what we have obtained in our first regression. We still find a significantly positive coefficient for our liquidity measures, CA/TA, and profitability measure, EBIT/TA, for C-HPR and alpha. C-HPR has 0.197 as the coefficient for CA/TA and 0.003 for EBIT/TA, while alpha has 0.042 as the coefficient for CA/TA and 0.023 for EBIT/TA. However, the distress dummy and the return volatility one year prior to bankruptcy do not reveal a significant effect in explaining the negative returns. Therefore,

profitability and information uncertainty play a significant role in explaining the positive returns, while liquidity and (un)profitability are the major key issues in negative returns.

Table 5: Regression – Accounting, Distress and Uncertainty

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.324	-0.767	0.043	-1.400	0.190	-0.505***	-0.381***	0.029
	(0.2646)	(0.3282)	(0.2677)	(0.1631)	(0.1762)	(<.0001)	(0.0014)	(0.3597)
CA/TA	0.396*	0.326	0.067**	0.364	0.194	0.196**	0.197**	0.043*
	(0.0815)	(0.6535)	(0.0252)	(0.5646)	(0.0743)	(0.0253)	(0.0412)	(0.0727)
EBIT/TA	0.003	0.000	0.020	1.530**	-0.013	0.001	0.003*	0.023**
	(0.5459)	(0.9679)	(0.1757)	(0.0495)	(0.9030)	(0.4126)	(0.0536)	(0.0434)
TL/TA	0.117	-0.038	-0.002	0.322	0.000	0.076*	0.014	-0.013
	(0.2663)	(0.8693)	(0.8682)	(0.4305)	(0.9977)	(0.058)	(0.7517)	(0.3214)
Distress	-0.136	-0.439	-0.028*	0.018	-0.051	-0.008	-0.028	-0.014
	(0.2280)	(0.1175)	(0.0752)	(0.963)	(0.4807)	(0.8384)	(0.5417)	(0.2325)
Stdev Pre-1 Ret	1.998	1.590	0.377	-17.891***	0.519	0.540	0.598	-0.243
	(0.2860)	(0.7943)	(0.1258)	(0.0099)	(0.4482)	(0.4123)	(0.4147)	(0.3221)
Log(Total Assets)	0.027	0.071	-0.008*	-0.254*	-0.012	-0.008	-0.043***	-0.003
	(0.4260)	(0.3544)	(0.0997)	(0.0733)	(0.6022)	(0.5374)	(0.0023)	(0.3735)
B/M	0.003	0.001	0.000	0.036**	0.001	0.002**	0.000	-0.001
	(0.2148)	(0.8160)	(0.7764)	(0.0102)	(0.4438)	(0.0493)	(0.9054)	(0.1834)
R-Square	5%	13%	8%	35%	15%	6%	8%	9%
F-Value	2.12*	1.02	2.38**	3.18***	0.75	1.59	2.24**	2.19**
N	238	56	214	49	40	175	42	174

We also investigate the influence of hedge funds on bankrupt stock performance. Hedge funds have become more and more active in corporate investment. Brav, Jiang, Partnoy, and Thomas (2008) investigate the involvement of hedge funds in corporate governance and whether their efforts impact the firm's performance. They find that hedge fund activists propose strategic, operational and financial solutions to the corporate firms and, in a majority of the cases, achieve at least partial success. Hedge funds play a significant role in increasing the target firms' payout, operating performance, and CEO turnover. Clifford (2008) compiles a sample of active and passive hedge fund activists based on their Schedule 13D or 13G filings. He finds that the target firms of active hedge fund activists enjoy larger excess returns and increases in operating performance than the ones of passive hedge fund activists. The results imply that hedge fund

activism has a positive effect on wealth creation. Boyson and Mooradian (working paper, 2010) focus on intense hedge fund activists. They document improvements in operating performance for up to three years following activism. Specifically they find such activism is associated with reduced cash position, growth in sales, reduced expenses, and increases leverage. The target firms also experience better short-term stock performance following the announcement of hedge fund involvement.

In our sample of 295 firms, we are able to identify 27 firms with 43 hedge fund investment in the year prior to the bankruptcy filing from 13D/13G filings with the SEC. They include some of the most famous hedge funds, such as Citadel, D. E. Shaw, Atticus Capital, and Amaranth Capital. If investors believe that hedge funds have hot hands and they can pick up the winning stock, they will be more willing to invest in the firms with hedge fund investment.

Table 6 shows the results of the following regression,

$$HPR_i = \alpha + \beta_1 * CA/TA_{i,pre1} + \beta_2 * EBIT/TA_{i,\ pre1} + \beta_3 * TL/TA_{i,\ pre1} + \beta_3 * TL/TA_{i,\ pre1} +$$

$$\beta_4 * Distress_{i,\ pre1} + \beta_5 * (Stdev\ Pre\text{-}1\ Ret)_{i,\ pre1} +$$

$$\beta_6 * Log\ (Total\ Assets)_{i,\ pre1} + \beta_7 * B/M_{i,\ pre1} + \beta_8 * HF_{i,\ pre1} + \varepsilon_i \qquad (6)$$

We add one more dummy, HF_{pre1} to our regression, which takes the value of 1 if a firm has hedge fund investment one year prior to its bankruptcy filing, and zero otherwise. The results of three accounting variables and two dummies of Distress and Stdev Pre-1 Ret are pretty similar to the ones we obtained in Table 5. The first result to notice is that, by adding HF dummy into our regression, we obtain higher R-squares and more significant models. For example, for negative alpha, the R-square increases from 9% in Table 5 to 24% in this table, and the F-Value also increases from 2.19 to 6.33, indicating that HF is indeed an important explanatory variables for the stock performance of bankrupt firms. Second is that receiving hedge fund investment does not necessarily indicate better stock performances. We have significant results for overall alpha, and negative C-HPR and alpha, with coefficient of -0.070, -0.157, and -0.105, which are all significant at least at the 5% level. The negative coefficients reveal that firms with hedge fund investments actually suffer from worse stock performances compared to the ones without. Therefore, we do not find evidence of hot hands from hedge funds when they are involved in bankrupt stocks.

Table 6: Regression – Accounting, Distress, Uncertainty and Hedge Fund

	Overall			Positive		Negative		
	S-HPR	C-HPR	Alpha	S-HPR	Alpha	S-HPR	C-HPR	Alpha
Intercept	-0.363	-0.808	0.029	-1.393	0.192	-0.506***	-0.414***	0.001
	(0.2131)	(0.2984)	(0.4449)	(0.1732)	(0.1825)	(<.0001)	(0.0005)	(0.9676)
CA/TA	0.365*	0.254	0.061**	0.362	0.195*	0.196**	0.173*	0.037*
	(0.0736)	(0.7235)	(0.0394)	(0.5726)	(0.0799)	(0.0270)	(0.0701)	(0.0956)
EBIT/TA	0.003	0.000	0.021	1.540*	-0.012	0.001	0.003*	0.022**
	(0.5635)	(0.9954)	(0.1532)	(0.0563)	(0.9108)	(0.4148)	(0.0605)	(0.0318)
TL/TA	0.131	0.054	0.003	0.325	0.001	0.077*	0.031	0.004
	(0.2165)	(0.8209)	(0.8285)	(0.4350)	(0.9832)	(0.0621)	(0.4871)	(0.7779)
Distress	-0.130	-0.386	0.361	0.019	0.537	0.538	0.481	-0.243
	(0.2497)	(0.1662)	(0.1354)	(0.9627)	(0.4545)	(0.4169)	(0.5081)	(0.2793)
Stdev Pre-1 Ret	1.932	0.678	-0.025	-17.861**	-0.053	-0.008	-0.020	-0.010
	(0.3018)	(0.9111)	(0.1069)	(0.0112)	(0.4836)	(0.8412)	(0.6616)	(0.3525)
Log(Total Assets)	0.034	0.080	-0.005	-0.253*	-0.013	-0.008	-0.038***	0.000
	(0.3238)	(0.2969)	(0.2579)	(0.0806)	(0.6051)	(0.5473)	(0.0076)	(0.9804)
B/M	0.003	0.002	0.000	0.037**	0.001	0.002**	0.000	0.000
	(0.1865)	(0.7298)	(0.6594)	(0.0210)	(0.4475)	(0.0500)	(0.8011)	(0.2673)
HF	-0.230	-0.439	-0.070***	0.042	0.009	-0.002	-0.157**	-0.105***
	(0.2188)	(0.1585)	(0.0042)	(0.9507)	(0.9195)	(0.9795)	(0.0257)	(<.0001)
R-Square	5%	17%	11%	35%	15%	6%	11%	24%
F-Value	1.76*	1.17	3.21***	2.72**	0.64	1.38	2.64***	6.33***
N	238	56	214	49	40	175	42	174

5.CONCLUSION

We investigate the returns from investing in bankrupt stocks. Besides the traditional holding period rate and alpha from the Carhart four-factor model, we also calculate a comprehensive HPR that takes account of the final distribution specified in the reorganization or liquidation plan. This information also plays a significant role in determining the ultimate returns to the common stock holders. The low stock prices attract unsophisticated investors who rush into this extremely volatile and uncertain market. Not surprisingly, investing in bankrupt stocks tends to generate large annualized losses: an average of -25.1% simple holding period return, and -76.9% if we take account of the final distributions. However, we also find that achieving positive returns from investing in bankrupt stocks is possible. We run two regressions to see which factors contributed the most to whether we can make a profit or not. We find that liquidity is always a key factor in explaining the returns. Higher liquidity will help the firms generate higher stock returns. When separating the returns into positive and negative ones, profitability and information uncertainty

plays a significant role in explaining the positive returns, while liquidity and (un)profitability are the two key issues in negative returns. In addition, the involvement of hedge funds does not show signs of better stock performance.

REFERENCES

Aharony, J., Jones, C. P., and Swary, I. (1980), An Analysis of Risk and Return Characteristics of Corporate Bankruptcy Using Capital Market Data, Journal of Finance, Vol.35, p.1001-1016.

Alderson, M.J. and Betker, B. (1999),Assessing Post-Bankruptcy Performance: An Analysis of Reorganized Firm's Cash Flows,Financial Management, Vol.28, No.2, p.68-82.

Altman, E. (1968), Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy,Journal of Finance, Vol.23, p.589-609.

Altman, E. I. (1969), Bankrupt Firms' Equity Securities as an Investment Alternative, Financial Analysts Journal, Vol.25, p.129-133.

Blume, M. E., Keim, D. B. and Patel, S. A. (1991), Returns and Volatility of Low-Grade Bonds 1977-1989, Journal of Finance, Vol.46, p.49-74.

Branch, B., and Russel, P. (2001), Penny Stocks of Bankrupt Firms: Are They Really a Bargain?Business Quest.

Bris, A., Welch, I., and Zhu, N. (2006), The Costs of Bankruptcy: Chapter 7 Liquidation vs. Chapter 11 Reorganization, Journal of Finance, Vol.61, p.1253-1305.

Brown, S. and Warner, J. (1980), Measuring Security Price Performance, Journal of Financial Economics, Vol.8, p.205-258.

Campbell, J., Hilscher, J., and Szilayi, J.(2008), In Search of Distress Risk, Journal of Finance, Vol.63, Issue 6, p.2557–3098.

Carhart, M. (1997), On Persistence in Mutual Fund Performance, Journal of Finance, Vol.52, p.57-82.

Chen, J., Hong, H. and Stein, J. C. (2002), Breadth of Ownership and Stock Returns, Journal of Financial Economics, Vol.66, p.171-205.

Clark, T. A., and Weinstein, M. I. (1983), The Behavior of the Common Stock ofBankrupt Firms, Journal of Finance, Vol.38, p.489-504.

Coelho, L. and Taffler, R. (2008), The Chapter 11 Bankruptcy Anomaly, Working paper,available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1102598.

Coelho, L. and Taffler, R., Working paper, 2008, Market Underreaction to Bad News: the Case of Bankruptcy Filing.

Datta, S. and Iskandar-Datta, M. E. (1995), The Information Content of Bankruptcy Filing on Security-holders of the Bankrupt Firm: An Empirical Investigation, Journal of Banking and Finance, Vol.19, p.903-919.

Dawkins, M., Bhattacharya, N., and Bamber, L. (2007), Systematic Share Price Fluctuations after Bankruptcy Filings and the Investors Who Drive Them,Journal of Financial and QuantitativeAnalysis, Vol. 42, p.399-420.

Dawkins, M. and Rose-Green, E. (1998), Prior Wall Street Journal Announcements of Possible Bankruptcy Filings and Price Reactions to Subsequent Bankruptcy Filing, Journal of BusinessFinance & Accounting, Vol.25, p.813-827.

Denis, D.K. and Rodgers K. J. (2007), Chapter 11: Duration, Outcome, and Post-reorganization Performance,Journal of Financial and Quantitative Analysis.

Dichev, I. (1998), Is the Risk of Bankruptcy a Systematic Risk?Journal of Finance, Vol.53, p.1131-1147.

Eberhart, A. C., Altman, E. I. and Aggarwal, R. (1999), The Equity Performance of Firms Emerging from Bankruptcy, Journal of Finance, Vol.54, p.1855-1868.

Fama, E., and K. French (1992), The Cross-Section of Expected Stock Returns, Journalof Finance, Vol.47, p.427-465.

Fama, E., and K. French (1993), Common Risk Factors in the Returns on Stocks and Bonds,Journal of Financial Economics,Vol.33, p.3-56.

Gilson, S. (1995), Investing in Distressed Situations: A Market Survey,Financial Analysts Journal, Vol.51, p.8-27.

Gilson, S.C., Hotchkiss, E.S. and Ruback, R. S. (2000), Valuation of Bankrupt Firms, Review of Financial Studies. Vol.13, Iss.1, p.32-43.

Griffin, J. and Lemmon, M. (2002), Book-to-Market Equity, Distress Risk, and Stock Returns, Journal of Finance, Vol.57, p.2317-2336.

Hotchkiss, E. S. (1995), Post-Bankruptcy Performance and Management Turnover,Journal of Finance, Vol.50, p.3-21.

Jegadeesh, N. and Titman, S. (1993), Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency, Journal of Finance, Vol.48, p.65-91.

Jiang, G., Lee, C., and Zhang, Y. (2005), Information Uncertainty and Expected Returns, Review of Accounting Studies, Vol.10, p.185-221.

Johnson, D. (1989), The Risk Behavior of Equity of Firms Approaching Bankruptcy, Journal of Financial Research, Vol.12, p.33-50.

Kalay, A.,Singhal, R., and Tashjian, E. (2007), Is Chapter 11 Costly?Journal of Financial Economics, Vol.84, p.772-796.

Michel, A., and Shaked, I. (1998), After Bankruptcy: Can Ugly Ducklings Turn Into Swans?Financial Analyst Journal, Vol. 54, No. 3, p.31-40.

Kothari, S. and Warner, J. (1997), Measuring Long-Horizon Security Price Performance,Journal of Financial Economics, Vol.43, p.301-339.

Lang, L. and Stulz, R. (1992), Contagion and Competitive Intra-Industry Effects of Bankruptcy Announcements: An Empirical Analysis, Journal of Financial Economics, Vol.32, p.45-60.

Li, L. and Zhong, K. (2013), Investing in Chapter 11 Stocks: Liquidity and Performance,Journal of Financial Markets, Vol.16, Issue 1, p.33–60.

Loughran, T. and Ritter, J. (1995), The New Issue Puzzle, Journal of Finance, Vol.50, p.23-51.

Maksimovic, V. and Phillips, G. (1998), Asset Efficiency and Reallocation Decisions of Bankrupt Firms,Journal of Finance, Vol.53, p.1495-1532.

Merton, R. (1974), On the Pricing of Corporate Debt: the Risk Structure of Interest Rates, Journal of Finance, Vol.29, p.449-70.

Morse, D., and Shaw, W. (1988), Investing in Bankrupt Firms, Journal of Finance, Vol.43,p.1193-1206.

Miller, E. M. (1977), Risk, Uncertainty and Divergence of Opinion, Journal of Finance, Vol. 32, p.1151-1168.

Opler, T. and Titman, S. (1994), Financial Distress and Corporate Performance, Journal of Finance, Vol.49, p.1015-1040.

Rose-Green, E. and Dawkins, M., (2002), Strategic Bankruptcies and Price Reactions to Bankruptcy Filings, Journal of Business Finance & Accounting, Vol.29, p.1319-1335.

Zhang, X. (2006), Information Uncertainty and Stock Returns, Journal of Finance, Vol.61, p.105-136.